



## SEQUENCE LISTING

<110> Hudson, Thomas J.  
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<120> IDENTIFICATION OF ARSACS MUTATIONS AND  
METHODS OF USE THEREFOR

<130> 2825.1021-003

<140> US 09/693,205

<141> 2000-10-20

<150> US 60/160,588

<151> 1999-10-20

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Ile	Met	Glu	Lys	Ile	Pro	Leu	Gln	Lys	Leu	Cys	Asn	Gln	Ile	Ala	Ser
130					135						140				
Leu	Leu	Pro	Thr	His	Lys	Asp	Ala	Leu	Arg	Lys	Phe	Leu	Ala	Ser	Leu
145				150						155				160	
Thr	Asp	Thr	Ser	Glu	Lys	Glu	Lys	Arg	Ile	Ile	Gln	Glu	Leu	Thr	Ile
			165					170						175	
Phe	Lys	Arg	Ile	Asn	His	Ser	Ser	Asp	Gln	Gly	Ile	Ser	Ser	Tyr	Thr
	180							185					190		
Lys	Leu	Lys	Gly	Cys	Lys	Val	Leu	Asp	His	Thr	Ala	Lys	Leu	Pro	Thr
	195					200						205			
Asp	Leu	Arg	Leu	Ser	Val	Ser	Val	Ile	Asp	Ser	Ser	Asp	Glu	Ala	Thr
210					215						220				
Ile	Arg	Leu	Ala	Asn	Met	Leu	Lys	Ile	Glu	Lys	Leu	Lys	Thr	Thr	Ser
225				230						235				240	
Cys	Leu	Lys	Phe	Val	Leu	Lys	Asp	Ile	Gly	Asn	Ala	Phe	Tyr	Thr	Gln
			245					250					255		
Glu	Glu	Val	Thr	Gln	Leu	Met	Leu	Trp	Ile	Leu	Glu	Asn	Leu	Ser	Ser
	260						265						270		
Leu	Lys	Asn	Glu	Asn	Ser	Asn	Val	Leu	Asp	Trp	Leu	Met	Pro	Leu	Lys
	275					280						285			
Phe	Ile	His	Met	Ser	Gln	Gly	His	Val	Val	Ala	Ala	Gly	Asp	Leu	Phe
290					295					300					
Asp	Pro	Asp	Ile	Glu	Val	Leu	Arg	Asp	Leu	Phe	Tyr	Asn	Glu	Glu	Glu
305					310					315				320	
Ala	Cys	Phe	Pro	Pro	Thr	Ile	Phe	Thr	Ser	Pro	Asp	Ile	Leu	His	Ser
			325					330						335	
Leu	Arg	Gln	Ile	Gly	Leu	Lys	Asn	Glu	Ser	Ser	Leu	Lys	Glu	Lys	Asp
		340						345					350		
Val	Val	Gln	Val	Ala	Arg	Lys	Ile	Glu	Ala	Leu	Gln	Val	Ser	Ser	Cys
	355					360						365			
Gln	Asn	Gln	Asp	Val	Leu	Met	Lys	Lys	Ala	Lys	Thr	Leu	Leu	Leu	Val
370					375						380				
Leu	Asn	Lys	Asn	Gln	Thr	Leu	Leu	Gln	Ser	Ser	Glu	Gly	Lys	Met	Ala
385					390					395				400	
Leu	Lys	Lys	Ile	Lys	Trp	Val	Pro	Ala	Cys	Lys	Glu	Arg	Pro	Pro	Asn
			405					410					415		
Tyr	Pro	Gly	Ser	Leu	Val	Trp	Lys	Gly	Asp	Leu	Cys	Asn	Leu	Cys	Ala
		420						425					430		

Pro	Pro	Asp	Met	Cys	Asp	Ala	Ala	His	Ala	Val	Leu	Val	Gly	Ser	Ser
		435					440					445			
Leu	Pro	Leu	Val	Glu	Ser	Val	His	Val	Asn	Leu	Glu	Gln	Ala	Leu	Ser
	450					455					460				
Ile	Phe	Thr	Lys	Pro	Thr	Ile	Asn	Ala	Val	Leu	Lys	His	Phe	Lys	Thr
465					470					475					480
Val	Val	Asp	Trp	Tyr	Thr	Ser	Lys	Thr	Phe	Ser	Asp	Glu	Asp	Tyr	Tyr
			485						490					495	
Gln	Phe	Gln	His	Ile	Leu	Leu	Glu	Ile	Tyr	Gly	Phe	Met	His	Asp	His
			500					505					510		
Leu	Ser	Glu	Gly	Lys	Asp	Ser	Phe	Lys	Ala	Leu	Lys	Phe	Pro	Trp	Val
		515					520					525			
Trp	Thr	Gly	Lys	Asn	Phe	Cys	Pro	Leu	Ala	Gln	Ala	Val	Ile	Lys	Pro
	530					535					540				
Thr	His	Asp	Leu	Asp	Leu	Gln	Pro	Tyr	Leu	Tyr	Asn	Val	Pro	Lys	Thr
545					550					555					560
Met	Ala	Lys	Phe	His	Gln	Leu	Phe	Lys	Ala	Cys	Gly	Ser	Ile	Glu	Glu
				565					570					575	
Leu	Thr	Ser	Asp	His	Ile	Ser	Met	Val	Ile	Gln	Lys	Val	Tyr	Leu	Lys
			580					585					590		
Ser	Asp	Gln	Glu	Leu	Ser	Glu	Glu	Glu	Ser	Lys	Gln	Asn	Leu	His	Leu
		595					600					605			
Met	Leu	Asn	Ile	Met	Arg	Trp	Leu	Tyr	Ser	Asn	Gln	Ile	Pro	Ala	Ser
	610					615					620				
Pro	Asn	Thr	Pro	Val	Pro	Ile	Tyr	His	Ser	Arg	Asn	Pro	Ser	Lys	Leu
625					630					635					640
Val	Met	Lys	Pro	Ile	His	Glu	Cys	Cys	Tyr	Cys	Asp	Ile	Lys	Val	Asp
				645					650					655	
Asp	Leu	Asn	Asp	Leu	Leu	Glu	Asp	Ser	Val	Glu	Pro	Ile	Ile	Leu	Val
			660					665					670		
His	Glu	Asp	Ile	Pro	Met	Lys	Thr	Ala	Glu	Trp	Leu	Lys	Val	Pro	Cys
		675					680						685		
Leu	Ser	Thr	Arg	Leu	Ile	Asn	Pro	Glu	Asn	Met	Gly	Phe	Glu	Gln	Ser
	690					695					700				
Gly	Gln	Arg	Glu	Pro	Leu	Thr	Val	Arg	Ile	Lys	Asn	Ile	Leu	Glu	Glu
705					710					715					720
Tyr	Pro	Ser	Val	Ser	Asp	Ile	Phe	Lys	Glu	Leu	Leu	Gln	Asn	Ala	Asp
				725					730					735	
Asp	Ala	Asn	Ala	Thr	Glu	Cys	Ser	Phe	Met	Ile	Asp	Met	Arg	Arg	Asn
			740					745					750		
Met	Asp	Ile	Arg	Glu	Asn	Leu	Leu	Asp	Pro	Gly	Met	Ala	Ala	Cys	His
		755				760						765			
Gly	Pro	Ala	Leu	Trp	Ser	Phe	Asn	Asn	Ser	Glu	Phe	Ser	Asp	Ser	Asp
	770					775					780				
Phe	Leu	Asn	Ile	Thr	Arg	Leu	Gly	Glu	Ser	Leu	Lys	Arg	Gly	Glu	Val
785					790					795					800
Asp	Lys	Val	Gly	Lys	Phe	Gly	Leu	Gly	Phe	Asn	Ser	Val	Tyr	His	Ile
				805					810					815	
Thr	Asp	Ile	Pro	Ile	Ile	Met	Ser	Arg	Glu	Phe	Met	Ile	Met	Phe	Asp
			820					825					830		
Pro	Asn	Ile	Asn	His	Ile	Ser	Lys	His	Ile	Lys	Asp	Arg	Ser	Asn	Pro
		835					840					845			
Gly	Ile	Lys	Ile	Asn	Trp	Ser	Lys	Gln	Gln	Lys	Arg	Leu	Arg	Lys	Phe
	850					855					860				
Pro	Asn	Gln	Phe	Lys	Pro	Phe	Ile	Asp	Val	Phe	Gly	Cys	Gln	Leu	Pro
865					870					875					880
Leu	Ala	Val	Glu	Ala	Pro	Tyr	Ser	Tyr	Asn	Gly	Thr	Leu	Phe	Arg	Leu
				885					890					895	

Ser Phe Arg Thr Gln Gln Glu Ala Lys Val Ser Glu Val Ser Ser Thr  
 900 905 910  
 Cys Tyr Asn Thr Ala Asp Ile Tyr Ser Leu Val Asp Glu Phe Ser Leu  
 915 920 925  
 Cys Gly His Arg Leu Ile Ile Phe Thr Gln Ser Val Asn Ser Met Tyr  
 930 935 940  
 Leu Lys Tyr Leu Lys Ile Glu Glu Thr Asn Pro Ser Leu Ala Gln Asp  
 945 950 955 960  
 Thr Ile Ile Ile Lys Lys Val Cys Pro Ser Lys Ala Leu Asn Ala  
 965 970 975  
 Pro Val Leu Ser Val Leu Lys Glu Ala Lys Leu Met Lys Thr Cys  
 980 985 990  
 Ser Ser Ser Asn Lys Lys Leu Pro Thr Asp Val Pro Lys Ser Ser Cys  
 995 1000 1005  
 Ile Leu Gln Ile Thr Val Glu Glu Phe His His Val Phe Arg Arg Ile  
 1010 1015 1020  
 Ala Asp Leu Gln Ser Pro Leu Phe Arg Gly Pro Asp Asp Asp Pro Ala  
 1025 1030 1035 1040  
 Thr Leu Phe Glu Met Ala Lys Ser Gly Gln Ser Lys Lys Pro Ser Asp  
 1045 1050 1055  
 Glu Leu Pro Gln Lys Thr Val Asp Cys Thr Thr Trp Leu Ile Cys Thr  
 1060 1065 1070  
 Cys Met Asp Thr Gly Glu Ala Leu Lys Phe Ser Leu Asn Glu Ser Gly  
 1075 1080 1085  
 Arg Arg Leu Gly Leu Val Pro Cys Gly Ala Val Gly Val Leu Leu His  
 1090 1095 1100  
 Glu Thr Gln Glu Gln Lys Trp Thr Val Lys Pro His Ile Gly Glu Val  
 1105 1110 1115 1120  
 Phe Cys Tyr Leu Pro Leu Arg Ile Lys Thr Gly Leu Pro Ile His Ile  
 1125 1130 1135  
 Asn Gly Cys Phe Ala Val Thr Ser Asn Arg Lys Glu Ile Trp Lys Thr  
 1140 1145 1150  
 Asp Thr Lys Gly Arg Trp Asn Thr Thr Phe Met Arg His Val Ile Val  
 1155 1160 1165  
 Lys Ala Tyr Leu Gln Ala Leu Ser Val Leu Arg Asp Leu Ala Ile Gly  
 1170 1175 1180  
 Gly Glu Leu Thr Asp Tyr Thr Tyr Tyr Ala Val Trp Pro Asp Pro Asp  
 1185 1190 1195 1200  
 Leu Val His Asp Asp Phe Ser Val Ile Cys Lys Gly Phe Tyr Glu Asp  
 1205 1210 1215  
 Ile Ala His Gly Lys Gly Lys Glu Leu Thr Arg Val Phe Ser Asp Gly  
 1220 1225 1230  
 Ser Met Trp Val Ser Met Lys Asn Val Arg Phe Leu Asp Asp Ser Ile  
 1235 1240 1245  
 Leu Gln Arg Lys Asp Val Gly Ser Ala Ala Phe Lys Ile Phe Leu Lys  
 1250 1255 1260  
 Tyr Leu Lys Lys Thr Gly Ser Lys Asn Leu Cys Ala Val Glu Leu Pro  
 1265 1270 1275 1280  
 Ser Ser Val Lys Ala Gly Phe Glu Glu Ala Gly Cys Lys Gln Ile Leu  
 1285 1290 1295  
 Leu Glu Asn Thr Phe Ser Glu Lys Gln Phe Phe Ser Glu Val Phe Phe  
 1300 1305 1310  
 Pro Asn Ile Gln Glu Ile Glu Ala Glu Leu Arg Asp Pro Leu Met Asn  
 1315 1320 1325  
 Phe Val Leu Asn Glu Lys Leu Asp Glu Phe Ser Gly Ile Leu Arg Val  
 1330 1335 1340  
 Thr Pro Cys Val Pro Cys Ser Leu Glu Gly His Pro Leu Val Leu Pro  
 1345 1350 1355 1360

Ser Arg Leu Ile His Pro Glu Gly Arg Val Ala Lys Leu Phe Asp Thr  
 1365 1370 1375  
 Lys Asp Gly Arg Phe Pro Tyr Gly Ser Thr Gln Asp Tyr Leu Asn Pro  
 1380 1385 1390  
 Ile Ile Leu Ile Lys Leu Val Gln Leu Gly Met Ala Lys Asp Asp Ile  
 1395 1400 1405  
 Leu Trp Asp Asp Met Leu Glu Arg Ala Glu Ser Val Ala Glu Ile Asn  
 1410 1415 1420  
 Lys Ser Asp His Ala Ala Cys Leu Arg Ser Ser Ile Leu Leu Ser  
 1425 1430 1435 1440  
 Leu Ile Asp Glu Lys Leu Lys Ile Lys Asp Pro Arg Ala Lys Asp Phe  
 1445 1450 1455  
 Ala Ala Lys Tyr Gln Thr Ile Pro Phe Leu Pro Phe Leu Thr Lys Pro  
 1460 1465 1470  
 Ala Gly Phe Ser Leu Glu Trp Lys Gly Asn Ser Phe Lys Pro Glu Thr  
 1475 1480 1485  
 Met Phe Ala Ala Thr Asp Ile Tyr Thr Ala Glu Tyr Gln Asp Ile Val  
 1490 1495 1500  
 Cys Leu Leu Gln Pro Ile Leu Asn Glu Asn Ser His Ser Phe Arg Gly  
 1505 1510 1515 1520  
 Cys Gly Ser Val Ser Leu Ala Val Lys Glu Phe Leu Gly Leu Leu Lys  
 1525 1530 1535  
 Lys Pro Thr Val Asp Leu Val Ile Asn Gln Leu Lys Gln Val Ala Lys  
 1540 1545 1550  
 Ser Val Asp Asp Gly Ile Thr Leu Tyr Gln Glu Asn Ile Thr Asn Ala  
 1555 1560 1565  
 Cys Tyr Lys Tyr Leu His Glu Ala Val Leu Gln Asn Glu Met Ala Lys  
 1570 1575 1580  
 Ala Thr Ile Ile Glu Lys Leu Lys Pro Phe Cys Phe Ile Leu Val Glu  
 1585 1590 1595 1600  
 Asn Val Tyr Val Glu Ser Glu Lys Val Ser Phe His Leu Asn Phe Glu  
 1605 1610 1615  
 Ala Ala Pro Tyr Leu Tyr Gln Leu Pro Asn Lys Tyr Lys Asn Asn Phe  
 1620 1625 1630  
 Arg Glu Leu Phe Glu Ser Val Gly Val Arg Gln Ser Phe Thr Val Glu  
 1635 1640 1645  
 Asp Phe Ala Leu Val Leu Glu Ser Ile Asp Gln Glu Arg Gly Lys Lys  
 1650 1655 1660  
 Gln Ile Thr Glu Glu Asn Phe Gln Leu Cys Arg Arg Ile Ile Ser Glu  
 1665 1670 1675 1680  
 Gly Ile Trp Ser Leu Ile Arg Glu Lys Arg Gln Glu Phe Cys Glu Lys  
 1685 1690 1695  
 Asn Tyr Gly Lys Ile Leu Leu Pro Asp Thr Asn Leu Leu Leu Pro  
 1700 1705 1710  
 Ala Lys Ser Leu Cys Tyr Asn Asp Cys Pro Trp Ile Lys Val Lys Asp  
 1715 1720 1725  
 Ser Thr Val Lys Tyr Cys His Ala Asp Ile Pro Arg Glu Val Ala Val  
 1730 1735 1740  
 Lys Leu Gly Ala Ile Pro Lys Arg His Lys Ala Leu Glu Arg Tyr Ala  
 1745 1750 1755 1760  
 Ser Asn Ile Cys Phe Thr Ala Leu Gly Thr Glu Phe Gly Gln Lys Glu  
 1765 1770 1775  
 Lys Leu Thr Ser Arg Ile Lys Ser Ile Leu Asn Ala Tyr Pro Ser Glu  
 1780 1785 1790  
 Lys Glu Met Leu Lys Glu Leu Leu Gln Asn Ala Asp Asp Ala Lys Ala  
 1795 1800 1805  
 Thr Glu Ile Cys Phe Val Phe Asp Pro Arg Gln His Pro Val Asp Arg  
 1810 1815 1820

Ile	Phe	Asp	Asp	Lys	Trp	Ala	Pro	Leu	Gln	Gly	Pro	Ala	Leu	Cys	Val	1825	1830	1835	1840
Tyr	Asn	Asn	Gln	Pro	Phe	Thr	Glu	Asp	Asp	Val	Arg	Gly	Ile	Gln	Asn	1845	1850	1855	
Leu	Gly	Lys	Gly	Thr	Lys	Glu	Gly	Asn	Pro	Cys	Lys	Thr	Gly	His	Tyr	1860	1865	1870	
Gly	Ile	Gly	Phe	Asn	Ser	Val	Tyr	His	Ile	Thr	Asp	Cys	Pro	Ser	Phe	1875	1880	1885	
Ile	Ser	Gly	Asn	Asp	Ile	Leu	Gly	Ile	Phe	Asp	Pro	His	Ala	Arg	Tyr	1890	1895	1900	
Ala	Pro	Gly	Ala	Thr	Ser	Val	Ser	Pro	Gly	Arg	Met	Phe	Arg	Asp	Leu	1905	1910	1915	1920
Asp	Ala	Asp	Phe	Arg	Thr	Gln	Phe	Ser	Asp	Val	Leu	Asp	Leu	Tyr	Leu	1925	1930	1935	
Gly	Asn	His	Phe	Lys	Leu	Asp	Asn	Cys	Thr	Met	Phe	Arg	Phe	Pro	Leu	1940	1945	1950	
Arg	Asn	Ala	Glu	Met	Ala	Gln	Val	Ser	Glu	Ile	Ser	Ser	Val	Pro	Ser	1955	1960	1965	
Ser	Asp	Arg	Met	Val	Gln	Asn	Leu	Leu	Asp	Lys	Leu	Arg	Ser	Asp	Gly	1970	1975	1980	
Ala	Glu	Leu	Leu	Met	Phe	Leu	Asn	His	Met	Glu	Lys	Ile	Ser	Ile	Cys	1985	1990	1995	2000
Glu	Ile	Asp	Lys	Ala	Thr	Gly	Gly	Leu	Asn	Val	Leu	Tyr	Ser	Val	Lys	2005	2010	2015	
Gly	Lys	Ile	Thr	Asp	Gly	Asp	Arg	Leu	Lys	Arg	Lys	Gln	Phe	His	Ala	2020	2025	2030	
Ser	Val	Ile	Asp	Ser	Val	Thr	Lys	Arg	Gln	Leu	Lys	Asp	Ile	Pro		2035	2040	2045	
Val	Gln	Gln	Ile	Thr	Tyr	Thr	Met	Asp	Thr	Glu	Asp	Ser	Glu	Gly	Asn	2050	2055	2060	
Leu	Thr	Thr	Trp	Leu	Ile	Cys	Asn	Arg	Ser	Gly	Phe	Ser	Ser	Met	Glu	2065	2070	2075	2080
Lys	Val	Ser	Lys	Ser	Val	Ile	Ser	Ala	His	Lys	Asn	Gln	Asp	Ile	Thr	2085	2090	2095	
Leu	Phe	Pro	Arg	Gly	Gly	Val	Ala	Ala	Cys	Ile	Thr	His	Asn	Tyr	Lys	2100	2105	2110	
Lys	Pro	His	Arg	Ala	Phe	Cys	Phe	Leu	Pro	Leu	Ser	Leu	Glu	Thr	Gly	2115	2120	2125	
Leu	Pro	Phe	His	Val	Asn	Gly	His	Phe	Ala	Leu	Asp	Ser	Ala	Arg	Arg	2130	2135	2140	
Asn	Leu	Trp	Arg	Asp	Asp	Asn	Gly	Val	Gly	Val	Arg	Ser	Asp	Trp	Asn	2145	2150	2155	2160
Asn	Ser	Leu	Met	Thr	Ala	Leu	Ile	Ala	Pro	Ala	Tyr	Val	Glu	Leu	Leu	2165	2170	2175	
Ile	Gln	Leu	Lys	Lys	Arg	Tyr	Phe	Pro	Gly	Ser	Asp	Pro	Thr	Leu	Ser	2180	2185	2190	
Val	Leu	Gln	Asn	Thr	Pro	Ile	His	Val	Val	Lys	Asp	Thr	Leu	Lys	Lys	2195	2200	2205	
Phe	Leu	Ser	Phe	Phe	Pro	Val	Asn	Arg	Leu	Asp	Leu	Gln	Pro	Asp	Leu	2210	2215	2220	
Tyr	Cys	Leu	Val	Lys	Ala	Leu	Tyr	Ser	Cys	Ile	His	Glu	Asp	Met	Lys	2225	2230	2235	2240
Arg	Leu	Leu	Pro	Val	Val	Arg	Ala	Pro	Asn	Ile	Asp	Gly	Ser	Asp	Leu	2245	2250	2255	
His	Ser	Ala	Val	Ile	Ile	Thr	Trp	Ile	Asn	Met	Ser	Thr	Ser	Asn	Lys	2260	2265	2270	
Thr	Arg	Pro	Phe	Phe	Asp	Asn	Leu	Leu	Gln	Asp	Glu	Leu	Gln	His	Leu	2275	2280	2285	

Lys Asn Ala Asp Tyr Asn Ile Thr Thr Arg Lys Thr Val Ala Glu Asn  
 2290 2295 2300  
 Val Tyr Arg Leu Lys His Leu Leu Leu Glu Ile Gly Phe Asn Leu Val  
 2305 2310 2315 2320  
 Tyr Asn Cys Asp Glu Thr Ala Asn Leu Tyr His Cys Leu Val Asp Ala  
 2325 2330 2335  
 Asp Ile Pro Val Ser Tyr Val Thr Pro Ala Asp Val Arg Ser Phe Leu  
 2340 2345 2350  
 Met Thr Phe Ser Ser Pro Asp Thr Asn Cys His Ile Gly Lys Leu Pro  
 2355 2360 2365  
 Cys Arg Leu Gln Gln Thr Asn Leu Lys Leu Phe His Ser Leu Lys Leu  
 2370 2375 2380  
 Leu Val Asp Tyr Cys Phe Lys Asp Ala Glu Glu Ser Glu Phe Glu Val  
 2385 2390 2395 2400  
 Glu Gly Leu Pro Leu Leu Ile Thr Leu Asp Ser Val Leu Gln Ile Phe  
 2405 2410 2415  
 Asp Gly Lys Arg Pro Lys Phe Leu Thr Thr Tyr His Glu Leu Ile Pro  
 2420 2425 2430  
 Ser Arg Lys Asp Leu Phe Met Asn Thr Leu Tyr Leu Lys Tyr Ser Ser  
 2435 2440 2445  
 Val Leu Leu Asn Cys Lys Val Ala Lys Val Phe Asp Ile Ser Ser Phe  
 2450 2455 2460  
 Ala Asp Leu Leu Ser Ser Val Leu Pro Arg Glu Tyr Lys Thr Lys Asn  
 2465 2470 2475 2480  
 Cys Ala Lys Trp Lys Asp Asn Phe Ala Ser Glu Ser Trp Leu Lys Asn  
 2485 2490 2495  
 Ala Trp His Phe Ile Ser Glu Ser Val Ser Val Thr Asp Asp Gln Glu  
 2500 2505 2510  
 Glu Pro Lys Pro Ala Phe Asp Val Ile Val Asp Ile Leu Lys Asp Trp  
 2515 2520 2525  
 Ala Leu Leu Pro Gly Thr Lys Phe Thr Val Ser Thr Ser Gln Leu Val  
 2530 2535 2540  
 Val Pro Glu Gly Asp Val Leu Ile Pro Leu Ser Leu Met His Ile Ala  
 2545 2550 2555 2560  
 Val Phe Pro Asn Ala Gln Ser Asp Lys Val Phe His Ala Leu Met Lys  
 2565 2570 2575  
 Ala Gly Cys Ile Gln Leu Ala Leu Asn Lys Ile Cys Ser Lys Asp Ser  
 2580 2585 2590  
 Ala Leu Val Pro Leu Leu Ser Cys His Thr Ala Asn Ile Asp Ser Pro  
 2595 2600 2605  
 Ala Ser Ile Leu Lys Ala Val His Tyr Met Val Gln Thr Ser Thr Phe  
 2610 2615 2620  
 Arg Thr Glu Lys Leu Met Glu Asn Asp Phe Glu Ala Leu Leu Met Tyr  
 2625 2630 2635 2640  
 Phe Asn Cys Asn Leu Ser His Leu Met Ser Gln Asp Asp Ile Lys Ile  
 2645 2650 2655  
 Leu Lys Ser Leu Pro Cys Tyr Lys Ser Ile Ser Gly Arg Tyr Met Ser  
 2660 2665 2670  
 Ile Ala Lys Phe Gly Thr Cys Tyr Val Leu Thr Lys Ser Ile Pro Ser  
 2675 2680 2685  
 Ala Glu Val Glu Lys Trp Thr Gln Ser Ser Ser Ser Ala Phe Leu Glu  
 2690 2695 2700  
 Glu Lys Val His Leu Lys Glu Leu Tyr Glu Val Leu Gly Cys Val Pro  
 2705 2710 2715 2720  
 Val Asp Asp Leu Glu Val Tyr Leu Lys His Leu Leu Pro Lys Ile Glu  
 2725 2730 2735  
 Asn Leu Ser Tyr Asp Ala Lys Leu Glu His Leu Ile Tyr Leu Lys Asn  
 2740 2745 2750

Arg Leu Ala Ser Ile Glu Glu Pro Ser Glu Ile Lys Glu Gln Leu Phe  
 2755 2760 2765  
 Glu Lys Leu Glu Ser Leu Leu Ile Ile His Asp Ala Asn Asn Arg Leu  
 2770 2775 2780  
 Lys Gln Ala Lys His Phe Tyr Asp Arg Thr Val Arg Val Phe Glu Val  
 2785 2790 2795 2800  
 Met Leu Pro Glu Lys Leu Phe Ile Pro Lys Glu Phe Phe Lys Lys Leu  
 2805 2810 2815  
 Glu Gln Val Ile Lys Pro Lys Asn Gln Ala Ala Phe Met Thr Ser Trp  
 2820 2825 2830  
 Val Glu Phe Leu Arg Asn Ile Gly Leu Lys Tyr Ala Leu Ser Gln Gln  
 2835 2840 2845  
 Gln Leu Leu Gln Phe Ala Lys Glu Ile Ser Val Arg Ala Asn Thr Glu  
 2850 2855 2860  
 Asn Trp Ser Lys Glu Thr Leu Gln Ser Thr Val Asp Ile Leu Leu His  
 2865 2870 2875 2880  
 His Ile Phe Gln Glu Arg Met Asp Leu Leu Ser Gly Asn Phe Leu Lys  
 2885 2890 2895  
 Glu Leu Ser Leu Ile Pro Phe Leu Cys Pro Glu Arg Ala Pro Ala Glu  
 2900 2905 2910  
 Tyr Ile Arg Phe His Pro Gln Tyr Gln Glu Val Asn Gly Thr Leu Pro  
 2915 2920 2925  
 Leu Ile Lys Phe Asn Gly Ala Gln Val Asn Pro Lys Phe Lys Gln Cys  
 2930 2935 2940  
 Asp Val Leu Gln Leu Leu Trp Thr Ser Cys Pro Ile Leu Pro Glu Lys  
 2945 2950 2955 2960  
 Ala Thr Pro Leu Ser Ile Lys Glu Gln Glu Gly Ser Asp Leu Ala Pro  
 2965 2970 2975  
 Gln Glu Gln Leu Glu Gln Val Leu Asn Met Leu Asn Val Asn Leu Asp  
 2980 2985 2990  
 Pro Pro Leu Asp Lys Val Ile Asn Asn Cys Arg Asn Ile Cys Asn Ile  
 2995 3000 3005  
 Thr Thr Leu Asp Glu Glu Met Val Lys Thr Arg Ala Lys Val Leu Arg  
 3010 3015 3020  
 Ser Ile Tyr Glu Phe Leu Ser Ala Glu Lys Arg Glu Phe Arg Phe Gln  
 3025 3030 3035 3040  
 Leu Arg Gly Val Ala Phe Val Met Val Glu Asp Gly Trp Lys Leu Leu  
 3045 3050 3055  
 Lys Pro Glu Glu Val Val Ile Asn Leu Glu Tyr Glu Ala Asp Phe Lys  
 3060 3065 3070  
 Pro Tyr Leu Tyr Lys Leu Pro Leu Glu Leu Gly Thr Phe His Gln Leu  
 3075 3080 3085  
 Phe Lys His Leu Gly Thr Glu Asp Ile Ile Ser Thr Lys Gln Tyr Val  
 3090 3095 3100  
 Glu Val Leu Ser Arg Ile Phe Lys Ser Ser Glu Gly Lys Gln Leu Asp  
 3105 3110 3115 3120  
 Pro Asn Glu Met Arg Thr Val Lys Arg Val Val Ser Gly Leu Phe Lys  
 3125 3130 3135  
 Ser Leu Gln Asn Asp Ser Val Lys Val Arg Ser Asp Leu Glu Asn Ala  
 3140 3145 3150  
 Arg Asp Leu Ala Leu Tyr Leu Pro Ser Gln Asp Gly Lys Leu Val Lys  
 3155 3160 3165  
 Ser Ser Ile Leu Val Phe Asp Asp Ala Pro His Tyr Lys Ser Arg Ile  
 3170 3175 3180  
 Gln Gly Asn Ile Gly Val Gln Met Leu Val Asp Leu Ser Gln Cys Tyr  
 3185 3190 3195 3200  
 Leu Gly Lys Asp His Gly Phe His Thr Lys Leu Ile Met Leu Phe Pro  
 3205 3210 3215

Gln Lys Leu Arg Pro Arg Leu Leu Ser Ser Ile Leu Glu Glu Gln Leu  
 3220 3225 3230  
 Asp Glu Glu Thr Pro Lys Val Cys Gln Phe Gly Ala Leu Cys Ser Leu  
 3235 3240 3245  
 Gln Gly Arg Leu Gln Leu Leu Ser Ser Glu Gln Phe Ile Thr Gly  
 3250 3255 3260  
 Leu Ile Arg Ile Met Lys His Glu Asn Asp Asn Ala Phe Leu Ala Asn  
 3265 3270 3275 3280  
 Glu Glu Lys Ala Ile Arg Leu Cys Lys Ala Leu Arg Glu Gly Leu Lys  
 3285 3290 3295  
 Val Ser Cys Phe Glu Lys Leu Gln Thr Thr Leu Arg Val Lys Gly Phe  
 3300 3305 3310  
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Ile 225	Tyr	Leu	Leu	Leu 230	Lys	Met	Arg	Ile	Gln	Met	Cys	Leu 235	Ser	Gly 240	His
His	Asn	Ser	Ser 245	Arg	Tyr	His	Arg	Asn	Arg 250	Trp	Tyr	Gln 255	Leu	Val 260	Asn
Ser	Leu	Thr	Leu 260	Ile	Lys	Tyr	Arg	Ile 265	Ser	Phe	Val	Met 270	Lys	Lys	Glu
Pro	Ile	Ser 275	His	Pro	Gln	Phe	Leu 280	Pro	His	Gln	Ile	Phe 285	Phe	Thr	Pro
Asp	Arg 290	Leu	Val	Lys	Thr	Lys 295	Pro	Val	Ser	Lys	Lys 300	Arg	Met	Leu	Cys
Lys 305	Trp	Gln	Lys	Lys 310	Leu	Lys	Pro	Tyr	Arg	Ser	Val 315	Leu	Val	Leu 320	Ile
Lys	Met	Phe	Phe 325	Arg	Lys	Pro	Lys	Pro	Ser 330	Tyr	Trp	Phe 335	Ile	Arg 340	Ile
Thr	His	Cys	Cys 340	Asn	His	Leu	Lys	Glu 345	Arg	His	Arg	Lys 350	Asn	Gly 355	Phe
Gln	Pro	Ala 355	Arg	Lys	Gly	Leu	Gln 360	Ile	Ile	Gln	Ala	Leu 365	Trp	Ser	Gly
Lys	Glu 370	Ile	Ser	Val	Ile	Ser 375	Val	His	His	Gln	Ile 380	Cys	Val	Met	Ala
Met 385	Gln	Phe	Ser	Leu	Ala 390	Pro	His	Phe	Leu	Leu 395	Lys	Val	Ser	Met 400	
Thr	Trp	Lys	Lys 405	His	Gly	Ser	Ser	Gln	Asn 410	Leu	Ala	Leu 415	Val	Leu 420	Ser
Asn	Thr	Leu	Lys 420	Leu	Leu	Leu	Ile	Gly 425	Ile	Leu	Gln	Lys 430	Pro	Leu 435	Val
Met	Lys	Thr 435	Thr	Ile	Asn	Ser	Ser 440	Ile	Phe	Cys	Leu 445	Arg	Phe	Thr	Asp
Ser	Cys 450	Met	Ile	Ile	Met	Lys 455	Gly	Lys	Ile	Leu	Leu 460	Glu	Pro	Asn	Phe

His	Gly	Phe	Gly	Leu	Ala	Lys	Ser	Phe	Val	His	Leu	Pro	Arg	Leu	Leu
465					470					475					480
Asn	Gln	Ser	Met	Ile	Leu	Thr	Phe	Ser	Leu	Ile	Cys	Ile	Met	Tyr	Leu
			485						490					495	
Lys	Pro	Trp	Gln	Asn	Ser	Thr	Asn	Tyr	Leu	Arg	Ser	Val	Val	Gln	Arg
			500					505					510		
Ser	His	Gln	Ile	Ile	Phe	Pro	Trp	Leu	Phe	Arg	Arg	Tyr	Ile	Ser	Lys
		515					520					525			
Val	Thr	Lys	Ile	Ser	Val	Asn	Lys	Lys	Ala	Asn	Lys	Ile	Phe	Ile	Leu
	530					535					540				
Cys	Ile	Leu	Ser	Asp	Gly	Cys	Ile	Ala	Ile	Arg	Phe	Gln	Gln	Ala	Pro
545					550					555					560
Thr	His	Gln	Phe	Leu	Tyr	Ile	Ile	Ala	Lys	Ile	Leu	Leu	Asn	Leu	Ser
				565					570					575	
Ser	Gln	Phe	Thr	Asn	Ala	Val	Ile	Val	Thr	Leu	Lys	Leu	Met	Thr	Leu
			580					585					590		
Met	Thr	Tyr	Leu	Lys	Ile	Leu	Trp	Asn	Gln	Ser	Phe	Trp	Cys	Met	Arg
		595					600					605			
Thr	Tyr	Pro	Lys	Leu	Gln	Asn	Gly	Lys	Phe	His	Ala	Leu	Val	Gln	Asp
	610					615					620				
Ile	Leu	Lys	Thr	Trp	Asp	Leu	Ser	Ser	Gln	Asp	Lys	Glu	Ser	His	Leu
625					630					635					640
Leu	Glu	Leu	Lys	Ile	Phe	Trp	Lys	Asn	Thr	Leu	Gln	Cys	Gln	Ile	Phe
				645					650					655	
Leu	Lys	Asn	Tyr	Phe	Lys	Thr	Leu	Met	Met	Gln	Met	Gln	Gln	Asn	Ala
			660					665					670		
Val	Ser	Leu	Ile	Glu	Glu	Ile	Trp	Thr	Glu	Arg	Ile	Ser	Thr	Gln	Gly
		675					680					685			
Trp	Gln	Leu	Val	Met	Asp	Leu	Leu	Cys	Gly	His	Ser	Thr	Ile	Leu	Asn
	690					695					700				
Ser	Gln	Ile	Gln	Ile	Leu	Thr	Leu	Gly	Glu	Asn	Leu	Lys	Gly	Glu	Lys
705					710					715					720
Leu	Thr	Lys	Leu	Glu	Asn	Leu	Val	Leu	Asp	Leu	Ile	Leu	Cys	Thr	Ile
				725					730					735	
Ser	Leu	Thr	Phe	Pro	Ser	Leu	Val	Gly	Asn	Ser	Cys	Ser	Ile	Gln	Thr
			740					745					750		
Ile	Ile	Ser	Val	Asn	Thr	Leu	Lys	Thr	Asn	Pro	Ile	Leu	Gly	Ser	Lys
		755					760					765			
Leu	Ile	Gly	Val	Asn	Asn	Arg	Lys	Asp	Leu	Glu	Asn	Phe	Leu	Ile	Ser
	770					775					780				
Ser	Asn	His	Leu	Met	Tyr	Leu	Ala	Val	Ser	Tyr	Leu	Leu	Lys	His	Leu
785					790					795					800
Thr	Ala	Ile	Met	Glu	Pro	Phe	Ser	Asp	Cys	Pro	Leu	Glu	Leu	Asn	Arg
				805					810					815	
Lys	Gln	Lys	Val	Lys	Leu	Val	Val	Arg	Ala	Thr	Ile	Gln	Gln	Ile	Phe
			820					825					830		
Ile	Leu	Leu	Trp	Met	Asn	Leu	Val	Ser	Val	Asp	Thr	Gly	Leu	Ser	Phe
		835				840						845			
Ser	Leu	Arg	Val	Ser	Gln	Cys	Ile	Ser	Thr	Lys	Leu	Arg	Lys	Pro	Thr
	850					855					860				
Pro	Val	His	Lys	Ile	Gln	Leu	Lys	Lys	Asn	Pro	Ala	Leu	Pro	Lys	His
865					870					875					880
Thr	His	Leu	Ser	Val	Phe	Lys	Arg	Leu	Leu	Ser	Ser	Arg	Leu	Ala	Ala
				885					890					895	
Ala	Val	Ile	Lys	Ser	Phe	Pro	Val	Met	Asn	Gln	Ser	His	Leu	Ala	Phe
			900					905					910		
Phe	Arg	Ser	Gln	Trp	Lys	Asn	Phe	Thr	Met	Cys	Ser	Glu	Gly	Leu	Leu
		915					920						925		

Ile	Tyr	Ser	Arg	His	Phe	Leu	Glu	Val	Gln	Met	Met	Thr	Gln	Leu	Leu	930	935	940
Ser	Leu	Lys	Trp	Leu	Ser	Leu	Ala	Asn	Gln	Lys	Ser	His	Gln	Met	Ser	945	950	955
Cys	His	Arg	Lys	Gln	Ser	Val	Pro	Arg	Gly	Phe	Cys	Val	Leu	Ala	Trp	965	970	975
Thr	Gln	Glu	Arg	Leu	Ser	Phe	Pro	Val	Arg	Val	Glu	Glu	Asp	Asp	Trp	980	985	990
Phe	His	Val	Gly	Gln	Glu	Phe	Ser	Cys	Gln	Lys	Ser	Arg	Thr	Arg	Ser	995	1000	1005
Gly	Gln	Asn	His	Thr	Leu	Glu	Arg	Cys	Phe	Ala	Ile	Tyr	Leu	Tyr	Glu	1010	1015	1020
Lys	Gln	Ala	Cys	Gln	Phe	Ile	Ser	Met	Gly	Ala	Leu	Leu	Leu	His	Gln	1025	1030	1035
Ile	Gly	Lys	Lys	Ser	Gly	Lys	Gln	Ile	Gln	Lys	Asp	Asp	Gly	Ile	Pro	1045	1050	1055
Arg	Ser	Asp	Met	Leu	Leu	Lys	Leu	Thr	Tyr	Arg	Tyr	Val	Ser	Tyr	Gly	1060	1065	1070
Thr	Trp	Pro	Leu	Val	Gly	Ser	Trp	Ile	Ile	Leu	Thr	Met	Gln	Tyr	Gly	1075	1080	1085
Pro	Ile	Leu	Ile	Phe	Met	Met	Ile	Phe	Leu	Phe	Ala	Lys	Asp	Phe	Met	1090	1095	1100
Lys	Ile	Leu	Met	Glu	Lys	Gly	Lys	Asn	Pro	Lys	Ser	Ser	Leu	Met	Asp	1105	1110	1115
Leu	Leu	Gly	Phe	Pro	Arg	Thr	Asp	Phe	Met	Thr	Leu	Tyr	Leu	Lys	Glu	1125	1130	1135
Glu	Met	Leu	Val	Gln	Gln	Pro	Ser	Arg	Tyr	Phe	Asn	Thr	Ser	Arg	Arg	1140	1145	1150
Leu	Gly	Pro	Lys	Thr	Phe	Val	Leu	Leu	Asn	Phe	Leu	Leu	Arg	Asn	Asp	1155	1160	1165
Leu	Lys	Lys	Leu	Ala	Ala	Asn	Arg	Tyr	Tyr	Leu	Lys	Thr	His	Phe	Gln	1170	1175	1180
Arg	Asn	Ser	Phe	Phe	Leu	Lys	Cys	Phe	Phe	Gln	Ile	Phe	Lys	Lys	Leu	1185	1190	1195
Lys	Gln	Asn	Leu	Glu	Ile	Leu	Ser	Leu	Phe	Met	Lys	Lys	Leu	Met	Ser	1205	1210	1215
Ser	Arg	Glu	Phe	Phe	Val	Leu	Leu	His	Val	Phe	Leu	Val	Pro	Trp	Arg	1220	1225	1230
Gly	Ile	Leu	Trp	Phe	Cys	His	Gln	Asp	Ser	Thr	Pro	Lys	Asp	Glu	Leu	1235	1240	1245
Gln	Ser	Tyr	Leu	Ile	Leu	Lys	Met	Gly	Asp	Ser	Leu	Met	Val	Leu	Leu	1250	1255	1260
Arg	Ile	Ile	Ser	Ile	Leu	Phe	Leu	Asn	Phe	Ser	Val	Trp	Gln	Lys		1265	1270	1275
Met	Ile	Phe	Tyr	Gly	Met	Ile	Cys	Asn	Val	Gln	Cys	Gln	Leu	Lys	Leu	1285	1290	1295
Ile	Lys	Val	Ile	Met	Leu	Leu	His	Ala	Glu	Val	Val	Ser	Tyr	Val	Leu	1300	1305	1310
Ser	Met	Arg	Asn	Lys	Gly	Ile	Leu	Glu	Gln	Arg	Ile	Leu	Leu	Gln	Asn	1315	1320	1325
Ile	Lys	Gln	Ser	Ala	Ser	Phe	His	Phe	Gln	Asn	Gln	Gln	Val	Phe	Leu	1330	1335	1340
Trp	Thr	Gly	Lys	Ala	Thr	Val	Leu	Ser	Leu	Lys	Pro	Cys	Leu	Gln	Gln	1345	1350	1355
Leu	Thr	Phe	Ile	Gln	Leu	Asn	Ile	Lys	Ile	Phe	Val	Phe	Cys	Asn	Gln	1365	1370	1375
Phe	Met	Lys	Ile	Pro	Ile	Leu	Leu	Glu	Val	Val	Val	Gln	Cys	His	Trp	1380	1385	1390



Leu Leu Lys Ser Phe Trp Asp Tyr Ser Arg Ser Gln Gln Leu Ile Trp  
 1395 1400 1405  
 Leu Thr Asn Lys Lys Gln Asn Gln Leu Met Met Glu Leu His Cys Thr  
 1410 1415 1420  
 Arg Arg Ile Ser Pro Met Leu Ala Thr Asn Thr Phe Met Lys Pro Cys  
 1425 1430 1435 1440  
 Lys Met Lys Ser Leu Arg Cys Gln Leu Leu Ile Ser Asn Pro Leu Ala  
 1445 1450 1455  
 Ser Phe Leu Arg Met His Met Leu Thr Gln Lys Arg Phe Leu Phe Ile  
 1460 1465 1470  
 Ile Leu Arg Arg His His Thr Phe Ile Ser Cys Leu Ile Ser Ile Lys  
 1475 1480 1485  
 Ile Ile Ser Ala Asn Phe Leu Lys Pro Trp Val Gly Ser His Ala Leu  
 1490 1495 1500  
 Leu Lys Ile Leu Leu Leu Phe Trp Asn Leu Leu Ile Lys Lys Glu Glu  
 1505 1510 1515 1520  
 Gln Ser Lys Gln Lys Arg Ile Phe Ser Phe Ala Asp Glu Ser Val Lys  
 1525 1530 1535  
 Glu Tyr Gly Val Ser Leu Glu Lys Arg Asn Lys Asn Phe Val Arg Lys  
 1540 1545 1550  
 Ile Met Ala Arg Tyr Tyr Cys Gln Ile Leu Ile Leu Cys Phe Ser Leu  
 1555 1560 1565  
 Leu Asn Arg Tyr Ala Thr Met Ile Ala Leu Gly Lys Arg Ile Pro Leu  
 1570 1575 1580  
 Asn Ile Val Met Leu Thr Tyr Pro Gly Lys Gln Asn Glu Gln Ser Gln  
 1585 1590 1595 1600  
 Ser Asp Thr Lys Pro Lys Asp Met His Pro Met Ser Val Leu Gln His  
 1605 1610 1615  
 Leu Ala Gln Asn Leu Gly Arg Lys Lys Asn Pro Ala Glu Leu Arg Ala  
 1620 1625 1630  
 Ser Leu Met His Ile Leu Leu Lys Arg Lys Cys Lys Ser Phe Phe Lys  
 1635 1640 1645  
 Met Leu Met Met Gln Arg Arg Gln Lys Ser Val Leu Cys Leu Ile Leu  
 1650 1655 1660  
 Asp Ser Ile Gln Leu Ile Glu Tyr Leu Met Ile Ser Gly Pro His Cys  
 1665 1670 1675 1680  
 Lys Gly Gln His Phe Val Cys Thr Thr Thr Ser His Leu Gln Lys Met  
 1685 1690 1695  
 Met Leu Glu Glu Phe Arg Ile Leu Glu Lys Ala Arg Lys Arg Glu Ile  
 1700 1705 1710  
 Leu Ile Lys Leu Asp Ser Met Glu Asp Ser Ile Leu Cys Ile Ile Ser  
 1715 1720 1725  
 Gln Thr Ala His Leu Leu Phe Leu Ala Met Thr Ser Cys Val Phe Leu  
 1730 1735 1740  
 Ile Leu Met Pro Asp Met His Gln Gly Pro His Pro Leu Val Pro Asp  
 1745 1750 1755 1760  
 Ala Cys Leu Glu Ile Trp Met Gln Ile Leu Gly His Ser Ser Gln Met  
 1765 1770 1775  
 Phe Trp Ile Phe Ile Trp Glu Pro Ile Leu Asn Trp Ile Ile Ala Gln  
 1780 1785 1790  
 Cys Ser Asp Phe Leu Phe Val Met Gln Lys Trp Gln Lys Phe Arg Lys  
 1795 1800 1805  
 Phe Arg Leu Phe Gln His Gln Thr Glu Trp Ser Arg Ile Phe Trp Thr  
 1810 1815 1820  
 Asn Cys Ala Gln Met Gly Gln Asn Phe Cys Phe Leu Ile Thr Trp Lys  
 1825 1830 1835 1840  
 Lys Phe Leu Phe Val Lys Ile Arg Val Leu Glu Leu Met Cys Cys Ile  
 1845 1850 1855

Gln	Arg	Ala	Lys	Ser	Gln	Met	Glu	Thr	Asp	Lys	Gly	Asn	Asn	Phe	Met		
			1860						1865				1870				
His	Leu	Leu	Ile	Val	Leu	Leu	Lys	Arg	Gly	Ser	Ser	Lys	Thr	Tyr	Gln		
		1875					1880					1885					
Phe	Asn	Lys	Pro	Ile	Leu	Trp	Ile	Leu	Arg	Thr	Leu	Lys	Glu	Ile	Leu		
	1890					1895					1900						
Leu	Arg	Gly	Phe	Val	Ile	Asp	Gln	Ala	Phe	Gln	Val	Trp	Arg	Lys	Tyr		
1905					1910					1915					1920		
Leu	Lys	Val	Ser	Tyr	Gln	Leu	Thr	Arg	Thr	Lys	Ile	Leu	Leu	Phe	Ser		
			1925						1930					1935			
His	Val	Val	Glu	Leu	Pro	Ala	Leu	Leu	Thr	Thr	Ile	Lys	Asn	Pro	Ile		
		1940							1945				1950				
Gly	Pro	Ser	Val	Phe	Cys	Leu	Phe	Leu	Trp	Arg	Leu	Gly	Cys	His	Phe		
	1955						1960					1965					
Met	Met	Ala	Thr	Leu	His	Trp	Ile	Gln	Pro	Glu	Gly	Thr	Cys	Gly	Val		
	1970					1975					1980						
Met	Ile	Met	Glu	Leu	Val	Phe	Glu	Val	Thr	Gly	Ile	Thr	Val	Gln	His		
1985					1990					1995					2000		
Leu	Leu	His	Met	Leu	Asn	Cys	Tyr	Ser	Lys	Asn	Gly	Ile	Ser	Leu	Val		
			2005						2010					2015			
Leu	Ile	Gln	His	Tyr	Gln	Cys	Tyr	Arg	Thr	Pro	Leu	Phe	Met	Leu	Arg		
		2020						2025					2030				
Thr	Leu	Arg	Ser	Phe	Tyr	Arg	Phe	Ser	Gln	Leu	Thr	Val	Leu	Ile	Tyr		
	2035						2040					2045					
Ser	Gln	Ile	Tyr	Ile	Val	Lys	His	Phe	Thr	Ile	Ala	Phe	Thr	Lys	Thr		
	2050					2055					2060						
Asn	Val	Phe	Tyr	Leu	Leu	Cys	Gly	Leu	Gln	Ile	Leu	Met	Ala	Leu	Thr		
2065					2070					2075					2080		
Cys	Thr	Leu	Gln	Leu	Leu	Leu	Gly	Ser	Ile	Cys	Leu	Leu	Leu	Ile	Lys		
			2085					2090						2095			
Leu	Asp	His	Phe	Leu	Thr	Ile	Tyr	Tyr	Arg	Met	Asn	Tyr	Asn	Thr	Leu		
		2100						2105					2110				
Lys	Met	Gln	Ile	Ile	Ile	Ser	Pro	His	Ala	Lys	Gln	Gln	Arg	Met	Ser		
	2115					2120						2125					
Ile	Gly	Asn	Ile	Ser	Phe	Lys	Leu	Val	Ser	Thr	Trp	Phe	Ile	Thr	Val		
	2130					2135					2140						
Met	Lys	Leu	Leu	Ile	Phe	Thr	Thr	Val	Leu	Met	Gln	Ile	Phe	Leu	Leu		
2145				2150						2155					2160		
Val	Met	Pro	Leu	Leu	Ile	Ser	Asp	Leu	Phe	His	Phe	Pro	Leu	Leu	Thr		
			2165						2170					2175			
Leu	Ile	Ala	Ile	Leu	Gly	Ser	Cys	Leu	Val	Val	Cys	Ser	Arg	Leu	Ile		
		2180						2185				2190					
Asn	Phe	Phe	Ile	Val	Asn	Phe	Leu	Ile	Ile	Val	Leu	Lys	Met	Gln	Lys		
	2195					2200						2205					
Lys	Met	Arg	Leu	Lys	Leu	Arg	Asp	Cys	Pro	Phe	Ser	Ser	His	Trp	Thr		
	2210					2215						2220					
Val	Phe	Cys	Lys	Leu	Leu	Met	Gln	Asn	Asp	Pro	Ser	Phe	Gln	His	Ile		
2225				2230						2235					2240		
Met	Asn	Phe	His	Pro	Ala	Lys	Thr	Cys	Leu	Ile	His	Tyr	Ile	Asn	Ile		
			2245						2250					2255			
Val	Ile	Phe	Tyr	Thr	Val	Lys	Leu	Gln	Lys	Cys	Leu	Thr	Phe	Pro	Ala		
		2260						2265					2270				
Leu	Leu	Ile	Cys	Tyr	Pro	Leu	Cys	Cys	Leu	Glu	Asn	Ile	Arg	Pro	Lys		
	2275						2280					2285					
Val	Ala	Gln	Ser	Gly	Lys	Thr	Ile	Leu	Gln	Val	Ser	Leu	Gly	Leu	Arg		
	2290					2295					2300						
Met	His	Gly	Ile	Leu	Leu	Val	Asn	Leu	Val	Lys	Lys	Ile	Arg	Lys	Lys		
2305					2310					2315					2320		

Gln	Asn	Gln	His	Leu	Thr	Leu	Leu	Leu	Ile	Leu	Lys	Thr	Gly	His	Cys	2325	2330	2335
Phe	Gln	Glu	Gln	Ser	Leu	Leu	Phe	Gln	Pro	Thr	Ser	Leu	Trp	Phe	Leu	2340	2345	2350
Lys	Glu	Met	Phe	Cys	Phe	Leu	Ser	Ala	Leu	Cys	Thr	Leu	Gln	Phe	Phe	2355	2360	2365
Gln	Met	Pro	Arg	Val	Ile	Lys	Phe	Phe	Met	Leu	Lys	Pro	Ala	Val	Phe	2370	2375	2380
Ser	Leu	Leu	Thr	Lys	Ser	Val	Pro	Lys	Thr	Val	His	Leu	Phe	Leu	Cys	2385	2390	2395
Cys	His	Val	Thr	Gln	Gln	Ile	Arg	Ala	Pro	Gln	Ala	Ser	Arg	Leu	Tyr	2405	2410	2415
Ile	Ile	Trp	Ser	Lys	Leu	Gln	His	Leu	Glu	Gln	Lys	Asn	Lys	Met	Ile	2420	2425	2430
Leu	Arg	His	Phe	Cys	Ile	Ser	Thr	Ala	Ile	Ile	Ile	Cys	Pro	Lys	Met	2435	2440	2445
Ile	Lys	Phe	Ser	His	Phe	Arg	Ala	Ile	Asn	Pro	Ser	Val	Ala	Ala	Met	2450	2455	2460
Ala	Leu	Glu	Asn	Leu	Glu	His	Ala	Thr	Tyr	Leu	Gln	Lys	Val	Ser	Leu	2465	2470	2475
Gln	Leu	Lys	Trp	Arg	Asn	Gly	His	Asn	His	His	His	Leu	His	Phe	Leu	2485	2490	2495
Lys	Lys	Lys	Tyr	Thr	Lys	Asn	Tyr	Met	Arg	Leu	Val	Val	Tyr	Leu	Met	2500	2505	2510
Ile	Leu	Arg	Tyr	Ile	Asn	Thr	Ser	Tyr	Gln	Lys	Leu	Lys	Ile	Ser	Leu	2515	2520	2525
Met	Met	Gln	Asn	Ser	Thr	Ser	Thr	Leu	Arg	Ile	Asp	Tyr	Gln	Val	Leu	2530	2535	2540
Arg	Asn	Tyr	Gln	Arg	Leu	Arg	Asn	Asn	Phe	Leu	Lys	Asn	Trp	Lys	Val	2545	2550	2555
Tyr	Ser	Met	Met	Leu	Thr	Val	Asp	Ser	Lys	Gln	Ser	Ile	Ser	Met	Ile	2565	2570	2575
Glu	Leu	Glu	Phe	Leu	Lys	Leu	Cys	Phe	Leu	Lys	Asn	Cys	Leu	Phe	Leu	2580	2585	2590
Met	Ile	Ser	Leu	Arg	Asn	Trp	Asn	Asn	Leu	Asn	Pro	Lys	Ile	Met	Leu	2595	2600	2605
His	Leu	His	Pro	Gly	Trp	Asn	Ser	Glu	Ile	Leu	Asp	Asn	Thr	Tyr	Phe	2610	2615	2620
Leu	Ser	Ser	Ser	Cys	Tyr	Ser	Leu	Leu	Arg	Lys	Ser	Val	Gly	Leu	Ile	2625	2630	2635
Gln	Lys	Thr	Gly	Pro	Lys	Lys	His	Cys	Lys	Ile	Gln	Leu	Ile	Ser	Phe	2645	2650	2655
Cys	Ile	Ile	Tyr	Ser	Lys	Asn	Glu	Trp	Ile	Cys	Tyr	Leu	Glu	Ile	Phe	2660	2665	2670
Lys	Asn	Tyr	Leu	Tyr	His	Ser	Tyr	Val	Leu	Ser	Gly	Pro	Pro	Arg	Asn	2675	2680	2685
Ser	Leu	Asp	Phe	Ile	Leu	Asn	Ile	Lys	Arg	Met	Glu	His	Phe	Leu	Leu	2690	2695	2700
Ser	Ser	Met	Glu	His	Arg	Ile	Gln	Asn	Ser	Ser	Asn	Val	Met	Tyr	Ser	2705	2710	2715
Ser	Cys	Tyr	Gly	His	Pro	Ala	Leu	Phe	Phe	Gln	Arg	Lys	Leu	His	Pro	2725	2730	2735
Ala	Leu	Lys	Asn	Lys	Lys	Val	Val	Thr	Leu	Val	His	Lys	Asn	Ser	Leu	2740	2745	2750
Asn	Lys	Phe	Ile	Cys	Leu	Met	Leu	Thr	Trp	Ile	Leu	Leu	Leu	Ile	Arg	2755	2760	2765
Ser	Ile	Thr	Ala	Glu	Thr	Tyr	Ala	Thr	Arg	Arg	Trp	Met	Lys	Lys	Trp	2770	2775	2780

Lys Leu Glu Gln Lys Ser Gly Ala Tyr Met Asn Ser Ser Val Gln Lys  
 2785 2790 2795 2800  
 Lys Gly Asn Phe Val Phe Ser Cys Glu Gly Leu Leu Leu Trp Lys Met  
 2805 2810 2815  
 Val Gly Asn Phe Ser Leu Arg Arg Ser Thr Asn Met Asn Leu Ile Leu  
 2820 2825 2830  
 Asn Leu Ile Cys Thr Ser Tyr Leu Asn Leu Ala His Phe Thr Ser Cys  
 2835 2840 2845  
 Ser Asn Thr Val Leu Lys Ile Leu Phe Gln Leu Ser Asn Met Leu Lys  
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Met	Ser	Ile	Ile	Asp	Lys	Leu	Lys	Pro	Phe	Ser	Phe	Ile	Leu	Val	Glu	1585	1590	1595
Asn	Ala	Tyr	Val	Asp	Ser	Glu	Lys	Val	Ser	Phe	His	Leu	Asn	Phe	Glu	1605	1610	1615
Ala	Ala	Pro	Tyr	Leu	Tyr	Gln	Leu	Pro	Asn	Lys	Tyr	Lys	Asn	Asn	Phe	1620	1625	1630
Arg	Glu	Leu	Phe	Glu	Thr	Val	Gly	Val	Arg	Gln	Ser	Cys	Thr	Val	Glu	1635	1640	1645
Asp	Phe	Ala	Leu	Val	Leu	Glu	Ser	Ile	Asp	Gln	Glu	Arg	Gly	Thr	Lys	1650	1655	1660
Gln	Ile	Thr	Glu	Glu	Asn	Phe	Gln	Leu	Cys	Arg	Arg	Ile	Ile	Ser	Glu	1665	1670	1675
Gly	Ile	Trp	Ser	Leu	Ile	Arg	Glu	Lys	Lys	Gln	Glu	Phe	Cys	Glu	Lys	1685	1690	1695
Asn	Tyr	Gly	Lys	Ile	Leu	Leu	Pro	Asp	Thr	Asn	Leu	Met	Leu	Leu	Pro	1700	1705	1710
Ala	Lys	Ser	Leu	Cys	Tyr	Asn	Asp	Cys	Pro	Trp	Ile	Lys	Val	Lys	Asp	1715	1720	1725
Thr	Thr	Val	Lys	Tyr	Cys	His	Ala	Asp	Ile	Pro	Arg	Glu	Val	Ala	Val	1730	1735	1740
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Lys	Glu	Met	Leu	Lys	Glu	Leu	Leu	Gln	Asn	Ala	Asp	Asp	Ala	Lys	Ala	1795	1800	1805
Thr	Glu	Ile	Cys	Phe	Val	Phe	Asp	Pro	Arg	Gln	His	Pro	Val	Asp	Arg	1810	1815	1820
Ile	Phe	Asp	Asp	Lys	Trp	Ala	Pro	Leu	Gln	Gly	Pro	Ala	Leu	Cys	Val	1825	1830	1835
Tyr	Asn	Asn	Gln	Pro	Phe	Thr	Glu	Asp	Asp	Val	Arg	Gly	Ile	Gln	Asn	1845	1850	1855
Leu	Gly	Lys	Gly	Thr	Lys	Glu	Gly	Asn	Pro	Tyr	Lys	Thr	Gly	Gln	Tyr	1860	1865	1870
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Asp	Ala	Asp	Phe	Arg	Thr	Gln	Phe	Ser	Asp	Val	Leu	Asp	Leu	Tyr	Leu	1925	1930	1935
Gly	Thr	His	Phe	Lys	Leu	Asp	Asn	Cys	Thr	Met	Phe	Arg	Phe	Pro	Leu	1940	1945	1950
Arg	Asn	Ala	Glu	Met	Ala	Lys	Val	Ser	Glu	Ile	Ser	Ser	Val	Pro	Ala	1955	1960	1965
Ser	Asp	Arg	Met	Val	Gln	Asn	Leu	Leu	Asp	Lys	Leu	Arg	Ser	Asp	Gly	1970	1975	1980
Ala	Glu	Leu	Leu	Met	Phe	Leu	Asn	His	Met	Glu	Lys	Ile	Ser	Ile	Cys	1985	1990	1995
Glu	Ile	Asp	Lys	Ser	Thr	Gly	Ala	Leu	Asn	Val	Leu	Tyr	Ser	Val	Lys	2005	2010	2015
Gly	Lys	Ile	Thr	Asp	Gly	Asp	Arg	Leu	Lys	Arg	Lys	Gln	Phe	His	Ala	2020	2025	2030

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Asp Ala Asn Ala Thr Glu Cys Ser Phe Leu Ile Asp Met Arg Arg Asn  
35 40 45  
Met Asp Ile Arg Glu Asn Leu Leu Asp Pro Gly Met Ala Ala Cys His  
50 55 60  
Gly Pro Ala Leu Trp Ser Phe Asn Asn Ser Gln Phe Ser Asp Ser Asp  
65 70 75 80  
Phe Val Asn Ile Thr Arg Leu Gly Glu Ser Leu Lys Arg Gly Glu Val  
85 90 95  
Asp Lys Val Gly Lys Phe Gly Leu Gly Phe Asn Ser Val Tyr His Ile  
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Conclude

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